

SEQUENCE LISTING

<110> PRESIDENT AND FELLOWS OF HARVARD COLLEGE

<120> DETECTION AND QUANTIFICATION OF MODIFIED PROTEINS

<130> 56954 PCT (70207)

<140> PCT/US03/07527

<141> 2003-03-11

<150> 60/363,179

<151> 2002-03-11

<160> 57

<170> PatentIn Ver. 2.1

<210> 1

<211> 6

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic  
6X-His tag

<400> 1

His His His His His His

1 5

<210> 2

<211> 6

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic  
peptide

<400> 2

Gly Phe Thr Ala Leu Lys

1 5

<210> 3

<211> 6

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic  
peptide

<400> 3

Ala Leu Glu Leu Phe Arg

1 5

<210> 4  
<211> 11  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Synthetic peptide

<400> 4  
Leu Phe Thr Gly His Pro Glu Thr Leu Glu Lys  
1 5 10

<210> 5  
<211> 5  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Synthetic peptide

<400> 5  
Ile Arg Asn Pro Asp  
1 5

<210> 6  
<211> 10  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Synthetic His tag

<220>  
<221> misc\_feature  
<222> (6)..(10)  
<223> This region may encompass 6-10 residues

<400> 6  
His His His His His His His His His  
1 5 10

<210> 7  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Exemplary sequence of a signature peptide produced by trypsin proteolysis

&lt;400&gt; 7

Leu Ile Phe Ala Gly Lys Gln Leu Glu Asp Gly Arg  
 1 5 10

&lt;210&gt; 8

&lt;211&gt; 60

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: Synthetic  
 poly-ubiquitinated polypeptide

&lt;400&gt; 8

Met Pro Phe Ile Thr Ser Arg Pro Val Ala Lys Asn Ser Ser His Ser  
 1 5 10 15

Leu Ser Glu Thr Asp Leu Asn Gln Ser Lys Gly Gln Pro Phe Gln Pro  
 20 25 30

Ser Pro Thr Lys Lys Leu Gly Ser Met Gln Gln Arg Arg Arg Ser Ser  
 35 40 45

Thr Ile Arg His Ala Leu Ser Ser Leu Leu Gly Gly  
 50 55 60

&lt;210&gt; 9

&lt;211&gt; 60

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: Synthetic  
 poly-ubiquitinated polypeptide

&lt;400&gt; 9

Ala Asn Val His Ser Pro Ala Val Leu Asn Asn Thr Thr Lys Gly Gly  
 1 5 10 15

Asn Asn Asn Gly Asn Ile Arg Ser Ser Asn Thr Asp Ala Gln Leu Leu  
 20 25 30

Gly Lys Lys Gln Asn Lys Gln Pro Pro Pro Asn Ala Arg Arg His Ser  
 35 40 45

Thr Thr Ala Ile Gln Gly Ser Ile Ser Asp Ser Ala  
 50 55 60

&lt;210&gt; 10

&lt;211&gt; 60

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: Synthetic  
poly-ubiquitinated polypeptide

&lt;400&gt; 10

Thr	Thr	Thr	Pro	Arg	Ser	Ser	Thr	Ser	Asp	Thr	Asn	Arg	Arg	Thr	Ser
1				5					10					15	

Gly	Arg	Leu	Ser	Val	Asp	Gln	Glu	Pro	Arg	Ile	Ser	Gly	Gly	Arg	Tyr
		20						25					30		

Ser	Gln	Ile	Glu	Glu	Asp	Ser	Thr	Val	Leu	Asp	Phe	Asp	Asp	Asp	His
		35					40					45			

Asn	Ser	Ser	Ala	Val	Val	Ser	Ser	Asp	Leu	Ser	Ser
	50					55				60	

&lt;210&gt; 11

&lt;211&gt; 60

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: Synthetic  
poly-ubiquitinated polypeptide

&lt;400&gt; 11

Thr	Ser	Leu	Thr	Arg	Leu	Ala	Asn	Ser	Lys	Lys	Phe	Asn	Glu	Gln	Phe
1				5					10					15	

Leu	Ile	Glu	Tyr	Leu	Thr	Ala	Arg	Gly	Leu	Leu	Gly	Pro	Lys	Thr	Val
		20						25					30		

Leu	Ser	Asn	Glu	Tyr	Leu	Lys	Ile	Ser	Ile	Ser	Thr	Ser	Gly	Glu	Ser
		35					40					45			

Val	Phe	Leu	Pro	Thr	Ile	Ser	Ser	Asn	Asp	Asp	Glu
	50					55					60

&lt;210&gt; 12

&lt;211&gt; 60

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: Synthetic  
poly-ubiquitinated polypeptide

&lt;400&gt; 12

Tyr	Leu	Ser	Arg	Leu	Asn	Gly	Leu	Asn	Asp	Gly	Thr	Asp	Asp	Ala	Glu
1				5					10					15	

Ala	Asp	Phe	Phe	Met	Asp	Gly	Ile	Asp	Gln	Gln	Glu	Gly	Asn	Thr	Pro
		20						25					30		

5/18

Ser Leu Ala Thr Thr Ala Ala Ala Thr Glu Ser Gly Gly Ser Ile Asn  
35 40 45

Glu Asn Arg Asp Thr Leu Leu Arg Glu Asn Asn Ser  
50 55 60

<210> 13  
<211> 60  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Synthetic  
poly-ubiquitinated polypeptide

<400> 13  
Gly Asp His Pro Gly Ser Gly Ser Glu Leu Asn Thr Arg Ser Val Glu  
1 5 10 15

Ile Asp Ser Ser Met Val Ser Tyr Ser Ile Ala Val Ile Val Ser Val  
20 25 30

Lys Lys Pro Thr Arg Phe Thr Asp Met Gln Leu Glu Leu Cys Ser Arg  
35 40 45

Val Lys Val Phe Trp Asn Thr Gly Val Pro Pro Thr  
50 55 60

<210> 14  
<211> 60  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Synthetic  
poly-ubiquitinated polypeptide

<400> 14  
Lys Thr Phe Asn Glu Glu Phe Tyr Asn Ala Ala Ser Met Lys Trp Asn  
1 5 10 15

Leu Asn Asp Glu Asn Phe Asp Leu Phe Val Pro Leu Ser Ile Ser Pro  
20 25 30

Asp Ile Asp Gln Met Glu Asn Asn Ser Asn Asp Arg Gln Met Arg Leu  
35 40 45

Phe Lys Asn Ile Pro Thr Glu Glu Arg Leu Tyr Leu  
50 55 60

<210> 15  
<211> 60  
<212> PRT  
<213> Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: Synthetic  
poly-ubiquitinated polypeptide

&lt;400&gt; 15

Asp	Lys	Thr	Lys	Thr	Lys	Ala	Ser	Leu	Leu	Asn	Ala	Ile	Asp	Val	Asn
1				5					10					15	

Lys	Thr	His	Leu	Tyr	Gln	Pro	Gly	Asp	Tyr	Val	Phe	Leu	Val	Pro	Val
			20					25					30		

Val	Phe	Ser	Asn	His	Ile	Pro	Glu	Thr	Ile	Tyr	Leu	Pro	Ser	Ala	Arg
		35					40					45			

Val	Ser	Tyr	Arg	Leu	Arg	Leu	Ala	Thr	Lys	Ala	Ile
	50				55						60

&lt;210&gt; 16

&lt;211&gt; 60

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: Synthetic  
poly-ubiquitinated polypeptide

&lt;400&gt; 16

Asn	Arg	Lys	Gly	Phe	Tyr	Arg	Gln	Asp	Ser	Asn	Ser	Pro	Gln	Pro	Ile
1				5					10					15	

Val	Ser	Pro	Asp	Ser	Ser	Ser	Ser	Leu	Ser	Ser	Thr	Thr	Ser	Ser	Leu
			20					25					30		

Lys	Leu	Thr	Glu	Thr	Glu	Ser	Ala	Gln	Ala	His	Arg	Arg	Ile	Ser	Asn
		35					40					45			

Thr	Leu	Phe	Ser	Lys	Val	Lys	Asn	His	Leu	His	Met
	50				55						60

&lt;210&gt; 17

&lt;211&gt; 60

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: Synthetic  
poly-ubiquitinated polypeptide

&lt;400&gt; 17

Ser	Ser	His	Gln	Leu	Lys	Asn	Glu	Glu	Ser	Gly	Glu	Glu	Asp	Ile	Phe
1				5					10					15	

Ala	Glu	Tyr	Pro	Ile	Lys	Val	Ile	Arg	Thr	Pro	Pro	Pro	Val	Ala	Val
			20					25					30		

7/18

Ser Thr Ala Asn Lys Pro Ile Tyr Ile Asn Arg Val Trp Thr Asp Ser  
35 40 45

Leu Ser Tyr Glu Ile Ser Phe Ala Gln Lys Tyr Val  
50 55 60

<210> 18

<211> 60

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic  
poly-ubiquitinated polypeptide

<400> 18

Ser Leu Asn Ser Glu Val Pro Ile Lys Ile Lys Leu Ala Pro Ile Cys  
1 5 10 15

Lys Asn Val Cys Val Lys Arg Ile His Val Ser Ile Thr Glu Arg Val  
20 25 30

Thr Phe Val Ser Lys Gly Tyr Glu Tyr Glu Tyr Asp Gln Thr Asp Pro  
35 40 45

Val Ala Lys Asp Pro Tyr Asn Pro Tyr Tyr Leu Asp  
50 55 60

<210> 19

<211> 60

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic  
poly-ubiquitinated polypeptide

<400> 19

Phe Ala Ser Lys Arg Arg Lys Glu Arg Ser Val Ser Leu Phe Glu Ile  
1 5 10 15

Arg Thr Lys Glu Lys Gly Thr Arg Ala Leu Arg Glu Glu Ile Val Glu  
20 25 30

Asn Ser Phe Asn Asp Asn Leu Leu Ser Tyr Ser Pro Phe Asp Asp Asp  
35 40 45

Ser Asp Ser Lys Gly Asn Pro Lys Glu Arg Leu Gly  
50 55 60

<210> 20

<211> 60

<212> PRT

<213> Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: Synthetic  
poly-ubiquitinated polypeptide

&lt;400&gt; 20

Ile	Thr	Glu	Pro	Ile	Ile	Ile	Glu	Thr	Lys	Leu	Lys	Phe	Pro	Lys	Tyr
1				5					10					15	

Glu	Asp	Leu	Asp	Lys	Arg	Thr	Ala	Lys	Ile	Ile	Pro	Pro	Tyr	Gly	Ile
			20					25					30		

Asp	Ala	Tyr	Thr	Ser	Ile	Pro	Asn	Pro	Glu	His	Ala	Val	Ala	Asn	Gly
		35					40					45			

Pro	Ser	His	Arg	Arg	Pro	Ser	Val	Ile	Gly	Phe	Leu
	50					55					60

&lt;210&gt; 21

&lt;211&gt; 60

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: Synthetic  
poly-ubiquitinated polypeptide

&lt;400&gt; 21

Ser	Gly	His	Lys	Gly	Ser	Lys	Ser	His	Glu	Glu	Asn	Glu	Lys	Pro	Val
1				5					10					15	

Tyr	Asp	Pro	Lys	Phe	His	Gln	Thr	Ile	Ile	Lys	Ser	Asn	Ser	Gly	Leu
			20					25					30		

Pro	Val	Lys	Thr	His	Thr	Arg	Leu	Asn	Thr	Pro	Lys	Arg	Gly	Leu	Tyr
		35					40					45			

Leu	Asp	Ser	Leu	His	Phe	Ser	Asn	Val	Tyr	Cys	Arg
	50					55					60

&lt;210&gt; 22

&lt;211&gt; 60

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: Synthetic  
poly-ubiquitinated polypeptide

&lt;400&gt; 22

His	Lys	Leu	Glu	Ile	Met	Leu	Arg	Ile	Ser	Lys	Pro	Asp	Pro	Glu	Cys
1				5					10					15	

Pro	Ser	Lys	Leu	Arg	His	Tyr	Glu	Val	Leu	Ile	Asp	Thr	Pro	Ile	Phe
			20					25					30		



9/18

Leu Val Ser Glu Gln Cys Asn Ser Gly Asn Met Glu Leu Pro Thr Tyr  
35 40 45

Asp Met Ala Thr Met Glu Gly Lys Gly Asn Gln Val  
50 55 60

<210> 23  
<211> 60  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Synthetic  
poly-ubiquitinated polypeptide

<400> 23  
Pro Leu Ser Met Asn Ser Asp Phe Phe Gly Asn Thr Cys Pro Pro Pro  
1 5 10 15

Pro Thr Phe Glu Glu Ala Ile Ser Val Pro Ala Ser Pro Ile Val Ser  
20 25 30

Pro Met Gly Ser Pro Asn Ile Met Ala Ser Tyr Asp Pro Asp Leu Leu  
35 40 45

Ser Ile Gln Gln Leu Asn Leu Ser Arg Thr Thr Ser  
50 55 60

<210> 24  
<211> 60  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Synthetic  
poly-ubiquitinated polypeptide

<400> 24  
Val Ser Gly Pro Ser Gly Tyr Ser Asp Asp Ala Gly Val Pro Asn Val  
1 5 10 15

Asn Arg Asn Ser Ile Ser Asn Ala Asn Ala Met Asn Gly Ser Ile Ser  
20 25 30

Asn Ser Ala Phe Val Ser Gly Asn Ser Gly Gln Gly Val Ala Arg Ala  
35 40 45

Arg Ala Thr Ser Val Asn Asp Arg Ser Arg Phe Asn  
50 55 60

<210> 25  
<211> 60  
<212> PRT  
<213> Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: Synthetic  
poly-ubiquitinated polypeptide

&lt;400&gt; 25

Asn	Leu	Asp	Lys	Leu	Leu	Ser	Thr	Pro	Ser	Pro	Val	Asn	Arg	Ser	His
1				5					10					15	

Asn	Ser	Ser	Pro	Thr	Asn	Gly	Leu	Ser	Gln	Ala	Asn	Gly	Thr	Val	Arg
			20					25					30		

Ile	Pro	Asn	Ala	Thr	Thr	Glu	Asn	Ser	Lys	Asp	Lys	Gln	Asn	Glu	Phe
		35					40					45			

Phe	Lys	Lys	Gly	Tyr	Thr	Leu	Ala	Asn	Val	Lys	Asp
	50					55					60

&lt;210&gt; 26

&lt;211&gt; 37

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: Synthetic  
poly-ubiquitinated polypeptide

&lt;400&gt; 26

Asp	Glu	Glu	Gln	Glu	Gly	Ile	Val	Ser	Ser	Ser	Ser	Ala	Asp	Ser	Leu
1				5					10					15	

Leu	Ser	His	Gly	Asn	Glu	Pro	Pro	Arg	Tyr	Asp	Glu	Ile	Val	Pro	Leu
			20					25					30		

Met	Ser	Asp	Glu	Glu
		35		

&lt;210&gt; 27

&lt;211&gt; 12

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: Synthetic  
signature peptide

&lt;400&gt; 27

Leu	Ile	Phe	Ala	Gly	Lys	Gln	Leu	Glu	Asp	Gly	Arg
1				5				10			

&lt;210&gt; 28

&lt;211&gt; 18

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: Synthetic  
signature peptide

&lt;400&gt; 28

Thr	Leu	Ser	Asp	Tyr	Asn	Ile	Gln	Lys	Glu	Ser	Thr	Leu	His	Leu	Val
1					5				10					15	

Leu Arg

&lt;210&gt; 29

&lt;211&gt; 21

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: Synthetic  
signature peptide

&lt;400&gt; 29

Thr	Leu	Thr	Gly	Lys	Thr	Ile	Thr	Leu	Glu	Val	Glu	Ser	Ser	Asp	Thr
1				5					10					15	

Ile	Asp	Asn	Val	Lys
			20	

&lt;210&gt; 30

&lt;211&gt; 18

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: Synthetic  
signature peptide

&lt;400&gt; 30

Thr	Ile	Thr	Leu	Glu	Val	Glu	Ser	Ser	Asp	Thr	Ile	Asp	Asn	Val	Lys
1				5					10					15	

Ser Lys

&lt;210&gt; 31

&lt;211&gt; 19

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: Synthetic  
signature peptide

&lt;400&gt; 31

Leu	Ile	Ser	Glu	Glu	Asp	Leu	Gly	Met	Gln	Ile	Phe	Val	Lys	Thr	Leu
1				5					10					15	

Thr Gly Lys

<210> 32  
 <211> 19  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Synthetic  
 phosphopeptide sequence

<400> 32  
 Ala Val Ser Val Ser Asp Leu Ser Tyr Val Ala Asn Ser Gln Ser Ser  
     1                    5                    10                    15

Pro Leu Arg

<210> 33  
 <211> 18  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Synthetic  
 phosphopeptide sequence

<400> 33  
 Gly Ser Gly Gly Thr Ser Glu Leu Gly Gly Ser Glu Ser Thr Pro Leu  
     1                    5                    10                    15

Leu Arg

<210> 34  
 <211> 17  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Synthetic  
 phosphopeptide sequence

<400> 34  
 Asp Glu Asn Asp Gly Tyr Ala Ser Asp Glu Val Gly Gly Thr Leu Ser  
     1                    5                    10                    15

Arg

<210> 35  
 <211> 12  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Synthetic  
 phosphopeptide sequence

&lt;400&gt; 35

Asp Asp Glu Tyr Asp Asp Leu Asn Thr Ile Asp Lys  
 1 5 10

&lt;210&gt; 36

&lt;211&gt; 15

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: Synthetic  
 phosphopeptide sequence

&lt;400&gt; 36

Asn Pro Ser Thr Leu Leu Pro Thr Ser Ser Met Phe Trp Asn Lys  
 1 5 10 15

&lt;210&gt; 37

&lt;211&gt; 16

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: Synthetic  
 phosphopeptide sequence

&lt;400&gt; 37

Asn Glu Glu Ser Gly Glu Glu Asp Ile Phe Ala Glu Tyr Pro Ile Lys  
 1 5 10 15

&lt;210&gt; 38

&lt;211&gt; 23

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: Synthetic  
 phosphopeptide sequence

&lt;400&gt; 38

His Ala Leu Ser Ser Leu Leu Gly Gly Ala Asn Val His Ser Pro Ala  
 1 5 10 15

Val Leu Asn Asn Thr Thr Lys  
 20

&lt;210&gt; 39

&lt;211&gt; 12

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: Synthetic  
phosphopeptide sequence

&lt;400&gt; 39

Arg Pro Ser Val Ile Gly Phe Leu Ser Gly His Lys  
1 5 10

&lt;210&gt; 40

&lt;211&gt; 18

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: Synthetic  
phosphopeptide sequence

&lt;400&gt; 40

Ser His Asn Ser Ser Pro Thr Asn Gly Leu Ser Gln Ala Asn Gly Thr  
1 5 10 15

Val Arg

&lt;210&gt; 41

&lt;211&gt; 14

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: Synthetic  
phosphopeptide sequence

&lt;400&gt; 41

Glu Glu Ile Asp Ser Glu Phe Glu Asp Glu Asp Phe Glu Lys  
1 5 10

&lt;210&gt; 42

&lt;211&gt; 22

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: Synthetic  
phosphopeptide sequence

&lt;400&gt; 42

Ala Ser Gly Glu Thr Ala Ile His Glu Pro Glu Pro Glu Ala Glu Gln  
1 5 10 15Ala Val Glu Asp Thr Ala  
20

&lt;210&gt; 43

&lt;211&gt; 22

<212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Synthetic  
 phosphopeptide sequence

<400> 43  
 Leu Gln Val Val Ser His Glu Thr Asp Ile Asn Glu Asp Glu Glu Glu  
           1                  5                  10                  15

Ala His Tyr Glu Asp Lys  
                   20

<210> 44  
 <211> 20  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Synthetic  
 phosphopeptide sequence

<400> 44  
 Lys Tyr Ser Asp Asn Glu Asp Asp Glu Tyr Asp Asp Ala Asp Leu His  
           1                  5                  10                  15

Gly Phe Glu Lys  
                   20

<210> 45  
 <211> 18  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Synthetic  
 phosphopeptide sequence

<400> 45  
 Arg Gly Ser Val Tyr His Val Pro Leu Asn Pro Val Gln Ala Thr Ala  
           1                  5                  10                  15

Val Arg

<210> 46  
 <211> 16  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Synthetic  
 phosphopeptide sequence

&lt;400&gt; 46

Ile	His	Asp	Thr	Ser	Asp	Glu	Asp	Met	Ala	Ile	Asn	Gly	Leu	Glu	Arg
1				5					10					15	

&lt;210&gt; 47

&lt;211&gt; 16

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: Synthetic  
phosphopeptide sequence

&lt;400&gt; 47

Asn	Asn	Asp	Ile	Glu	Ser	Ser	Ser	Pro	Ser	Gln	Leu	Gln	His	Glu	Ala
1				5				10						15	

&lt;210&gt; 48

&lt;211&gt; 15

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: Synthetic  
phosphopeptide sequence

&lt;400&gt; 48

Ser	Val	Asn	Tyr	Asn	Glu	Leu	Ser	Asp	Asp	Asp	Thr	Ala	Val	Lys
1				5				10						15

&lt;210&gt; 49

&lt;211&gt; 9

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: Synthetic  
phosphopeptide sequence

&lt;400&gt; 49

Thr	Leu	Ser	Asp	Tyr	Asn	Ile	Gln	Lys
1				5				

&lt;210&gt; 50

&lt;211&gt; 16

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: Synthetic  
phosphopeptide sequence



&lt;400&gt; 50

Ile Glu Glu Ile Asn Glu Asn Ser Pro Leu Leu Ser Ala Pro Ser Lys  
1 5 10 15

&lt;210&gt; 51

&lt;211&gt; 12

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: Synthetic  
phosphopeptide sequence

&lt;400&gt; 51

Thr Asn Ser Phe Asp Met Pro Gln Leu Asn Thr Arg  
1 5 10

&lt;210&gt; 52

&lt;211&gt; 16

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: Synthetic  
phosphopeptide sequence

&lt;400&gt; 52

Glu Thr Val Asp Asp Asp Ser Glu Thr Leu Asn Gln Leu Gln Asp Arg  
1 5 10 15

&lt;210&gt; 53

&lt;211&gt; 12

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: Synthetic  
phosphopeptide sequence

&lt;400&gt; 53

Leu Pro Ser Tyr Glu Glu Ala Ala Gly Thr Pro Lys  
1 5 10

&lt;210&gt; 54

&lt;211&gt; 16

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: Synthetic  
phosphopeptide sequence

&lt;400&gt; 54

Lys Asn Pro Asp Glu Asp Glu Phe Leu Ile Asn Ser Asp Asp Glu Met  
 1 5 10 15

&lt;210&gt; 55

&lt;211&gt; 29

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: Synthetic  
 phosphopeptide sequence

&lt;400&gt; 55

Ser Ser Gly Ile Asp Glu Asp Glu Val Val Thr Pro Ala Glu Asp Ala  
 1 5 10 15

Lys Glu Glu Glu Glu Glu His Pro Pro Leu Pro Ala Arg  
 20 25

&lt;210&gt; 56

&lt;211&gt; 19

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: Synthetic  
 phosphopeptide sequence

&lt;400&gt; 56

Glu Gln His His Glu Asp Ser Glu Glu Glu Asp Ser Trp Ser Gln Phe  
 1 5 10 15

Val Glu Lys

&lt;210&gt; 57

&lt;211&gt; 21

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: Synthetic  
 phosphopeptide sequence

&lt;400&gt; 57

His Val Ile Ala Asp Leu Glu Asp His Glu Ser Ser Asp Glu Glu Gly  
 1 5 10 15

Thr Ala Leu Pro Lys  
 20